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EPA-REGION 10

September 6, 2016

ATTN: Harbor Comments, U.S. EPA
805 SW Broadway
Suite 500
Portland, OR 97205

**Re: Portland Harbor Superfund Site
Union Pacific's Comments on Proposed Plan**

Dear EPA Region 10:

Union Pacific Railroad Company ("Union Pacific") submits these comments on the U.S. Environmental Protection Agency's ("EPA") 2016 Feasibility Study and Proposed Plan for the Portland Harbor Site ("Site"). Union Pacific is a signatory to the 2001 Administrative Order on Consent ("AOC") for Remedial Investigation/ Feasibility Study ("RI/FS"), as amended, and a member of the Lower Willamette Group ("LWG"), which is the group of private companies and the City of Portland and Port of Portland that performed the RI and prepared a draft FS.¹

In short, Union Pacific is concerned that EPA's FS and Proposed Plan do not comply in numerous, significant ways with regulatory requirements and guidance recommendations for evaluating and selecting cleanups at sediment mega-sites. Union Pacific urges that the selection and implementation of the cleanup be performed as described in CERCLA and the National Contingency Plan ("NCP").

One of the fundamental principles of the Superfund program as expressed in the Preamble to the 1990 NCP is that the remedy selection process consider "the full range of factors pertinent to remedy selection and provides the flexibility necessary to ensure that remedial actions selected are *sensible, reliable solutions* for identified site problems."² The EPA's remedy selection process for the Site is contrary to these fundamental principles, and is arbitrary and capricious.

EPA employed flawed, unscientific methodology and unsupported assumptions, and the result is a proposed remedy with unnecessarily stringent and unachievable cleanup levels and risk reduction goals, at a cost far more than estimated by EPA. PCBs (through the consumption

¹ Union Pacific is also participating in the comment letter prepared by the LWG.

² 55 Federal Register 8666, 8700 (March 8, 1990) (emphasis added).



of resident fish) are the primary risk at the Site, but the EPA has ignored that the concentrations of PCBs in sediments have been diminishing.

A major cleanup action must be designed and implemented to achieve desired outcomes. The benefits (*i.e.*, risk reduction) must be achievable and commensurate with the cost and time to complete the cleanup. The evaluation and selection process set forth in the NCP, 40 C.F.R. § 300.430, requires careful consideration of the critical elements of risk reduction, cost-effectiveness and time. Because EPA has used deeply flawed scientific evaluations and methodologies to evaluate risk reduction, cost-effectiveness, and time it has not complied with CERCLA and the NCP and its actions are arbitrary and capricious.

EPA Region 10 promotes a preferred alternative that requires attainment of a total PCB cleanup goal that is not achievable and sustainable, and which is far more disruptive than described by EPA, will take much longer to implement than predicted by EPA, will likely cost significantly more than estimated by EPA, and is therefore not cost-effective as required by the NCP. EPA's preferred alternative is far from a "sensible, reliable solution" for the Site.

EPA is also substantially contributing to the inordinate length of time it is taking to select and perform cleanup actions at the Site, which was included on the National Priorities List in 2000. The LWG's 2012 draft FS fulfilled the requirements of the law and EPA guidance, proposing a workable, common sense cleanup. EPA's unnecessary and inappropriate takeover of the FS from the LWG has diminished the quality and value of the FS. The LWG's 2012 draft FS incorporated reliable science, provided the required comparative analysis of alternatives, and relied on realistic estimates of cost and time necessary to perform work.

The LWG was prepared to fully engage with EPA and resolve EPA's comments and concerns in order to produce a report that provided a credible basis for EPA's selection of a remedy that conformed to CERCLA, the NCP, and EPA guidance. EPA's unwarranted deviation from the RI/FS process agreed to by EPA in 2001 was an abuse of discretion and is not leading to an effective and timely cleanup.

Union Pacific requests that EPA carefully consider the following comments and issue a Record of Decision ("ROD") that describes a cost-effective remedy for the Site that is protective, realistically achievable, based on sound science, and in compliance with legal requirements for selecting cleanup actions.

1. EPA's Methodology for Assessing Risk Is Overly Conservative

The primary objective of the cleanup is to reduce risks. The primary health risk at the Site is the consumption of resident fish. Accordingly, analyzing a remedy's risk reduction potential requires both a realistic identification of existing risks (and resulting cleanup goals) and a reasonable assessment of anticipated risk reduction resulting from the cleanup. EPA has used questionable and flawed methodologies on both sides of this equation that are inconsistent with the NCP and applicable EPA guidance documents.

a. EPA's Identification of the Existing Risks is Unrealistic, Based on Incomplete Data, and Fails to Account for Significant Uncertainty

EPA's Baseline Human Health Risk Assessment ("BHHRA"), including the determination of reasonable maximum exposure ("RME") (i.e., an exposure that can be reasonably expected to occur but is not the worst-case exposure³), is founded upon cascading unrealistic and unsupported assumptions regarding exposure, including: number of fish consumed, method of cooking fish, areas of the river at issue and duration of exposure. One example among many is that EPA assumes that recreational and subsistence fishers' sole source of fish is resident fish caught from Portland Harbor. This hypothetical fisher does not catch and consume salmon or other anadromous fish from the Site, does not catch and consume fish from outside the Site, and does not consume store-bought fish. EPA has assumed this hypothetical fisher eats nothing but resident fish from the Lower Willamette River. The record contains no support for such an assumption, nor does it contain evidence of a significant population whose diet is solely dependent on resident fish from the Site.

All of the fish tissue data used in EPA's BHHRA relies entirely on data collected between 2003 and 2007, ignoring the significant data that was collected and provided to EPA at EPA's request in 2012. These 2012 data demonstrate PCB concentrations in resident fish tissue are declining. Kennedy-Jenks, an international firm that was the LWG's human health risk assessment consultant for the Site, concluded, "it appears likely from the [fish tissue] data that maximum concentrations decreased between 2012 and prior years in most locations. Overall, it is likely that total PCB concentrations in whole body smallmouth bass are decreasing in Portland Harbor."⁴ EPA chose to disregard the 2012 data it asked the LWG to collect. Without the 2012 data, the data set for fish tissue in many areas of the Site is insufficient to calculate RME at the upper 95 percent confidence level as required by EPA's risk assessment guidance.⁵ Rather than using a robust and more current data set, EPA defaults to maximum concentrations in assessing risk, which arbitrarily increases the RME.

In addition to questionable assumptions regarding exposure to resident fish, EPA does not take into consideration several key uncertainties in assessing risk, including food preparation and cooking methods (which can reduce PCB concentrations by up to 87 percent).⁶

³ NCP Preamble, 55 FR 8713.

⁴ Kennedy/Jenks Consultants Memos dated March 6, 2013 and March 13, 2013. Kennedy Jenks' memo acknowledges it is comparing 2012 discrete samples to earlier composite samples and bases its comparison on means, maximum, and minimum detected concentrations. AnchorQEA, another LWG consultant, also submitted its evaluation of the 2012 data and concluded that PCB concentrations were declining. Lower Willamette Small Mouth Bass Data Monitored Natural Recovery (MNR) Analysis (March 18, 2013) and 2012 Small Mouth Bass Work Plan and Results (June 19, 2013).

⁵ EPA's Risk Assessment Guidance for Superfund Volume I Human Health Evaluation Manual (Part A), page 6-19 (December 1989).

⁶ EPA's Baseline Human Health Risk Assessment dated March 28, 2013, page 89. EPA states that on page 49 of the same document that no adjustments were made to contaminant concentrations in raw fish tissue because of the uncertainties associated with preparation and cooking practices.

EPA's assumptions are not merely conservative but are wholly unrealistic, contrary to the "conservative but within a realistic range of exposure scenarios" recommended by the NCP.⁷

The effects of the unrealistic risk assumptions are further exacerbated by the absence of credible risk management which must take into account uncertainties in the data. Risk management in the Superfund program requires consideration of the advantages and disadvantages of cleanup alternatives and a balancing of trade-offs. This analysis includes an evaluation of the uncertainties at the Site, including uncertainties in the reliability of the exposure data used to identify the risks. 40 C.F.R. § 300.430(e)(2)(i)(A)(4). Further, as noted in the NCP Preamble, "[t]he likelihood of the exposure actually occurring should be considered when deciding the appropriate level of remediation, to the degree that this likelihood can be determined."⁸

As described in EPA's 2005 Sediment Guidance: "A risk management process should be used to select a remedy designed to reduce the key human and ecological risks effectively."⁹ It is telling that the phrase "risk management" is never used in the FS or the Proposed Plan. It is not apparent that uncertainties with respect to the sufficiency of the data, exposure assumptions, and preparation/cooking of fish were taken into account when developing cleanup goals. As a result, proposed cleanup goals are much lower than would otherwise be required had the assessment of risk been conducted in accordance with EPA regulations and guidance, and sound science.

b. EPA's Evaluation of Risk Reduction is Flawed

The unreasonable conservatism and questionable methodology extend to development of surface-area weighted average concentrations ("SWACs") and remedial action levels ("RALs").¹⁰ SWACs are used to develop RALs, which identify those areas requiring active remediation (e.g., dredging or capping). RALs are the basis for sediment management area ("SMA") footprints and drive the scope of active remediation measures. EPA calculates RALs by plotting acres to be remediated against a range of concentrations for post remediation SWACs. As the post remediation SWAC decreases, the areas to be dredged or capped increase. The RAL is the contaminant concentration that delineates the area to be dredged or capped. Each alternative has its own specific set of RALs for the four focused contaminants of concern.¹¹

EPA explains its key factor for comparing alternatives: "While specific RAL values are not cleanup levels, residual contaminant concentrations remaining after remediating the RAL

⁷ NCP Preamble, 55 FR 8710.

⁸ NCP Preamble, 55 FR 8710.

⁹ Contaminated Sediment Remediation Guidance for Hazardous Waste Sites, EPA Office of Solid Waste and Emergency Response, page 7-1 (December 2005).

¹⁰ RALs were developed for the focused contaminants of concern: PCBs, total PAHs, dioxin/furans, and DDX. Proposed Plan, Table 12.

¹¹ Feasibility Study, page ES-8, FS Tables 3.4-1 through 6, and FS Figures 3.4-1 through 6.

footprint can be used to compare the relative effectiveness of the alternatives in reducing contaminant concentrations, which is directly related to risk reduction.”¹²

Thus, EPA compares initial Site-wide SWACs to its estimated post-construction Site-wide SWACs to calculate percent reductions across the alternatives. Reductions in the Site-wide SWAC were estimated by assuming the constructed area achieves an ideal constructed surface concentration of zero. Accordingly, if the current (*i.e.*, initial) SWAC is arbitrarily high, the effectiveness of specific alternatives in achieving post-construction SWACs (*i.e.*, risk reduction) is skewed towards alternatives with lower RALs.

With no stated explanation or apparent scientific support, EPA used an initial SWAC of 208 parts per billion (“ppb”) for PCBs in the 2016 FS to calculate percent reductions in Site-wide SWACs achieved by the alternatives.¹³ The 208 ppb value significantly exceeds the initial condition 85 ppb SWAC derived from the 2001-10 RI data used in EPA’s draft 2015 FS and the BHHRA.

Use of the higher SWAC for PCBs and other contaminants is clearly wrong and represents an arbitrary decision. The trend in the data is towards decreasing initial SWAC concentrations. In 2013, the LWG presented an evaluation of smallmouth bass PCB tissue measurements made in 2002, 2007, and 2012 which indicate significant declines in tissue concentrations across almost all areas of the Site.¹⁴ Further, 2014 sedimentation bathymetry data and 2014 site-wide sediment PCB data support this downward trend in contaminant concentrations in surface sediments due to the effects of natural recovery at the Site.¹⁵

EPA acknowledges receipt of the data but inexplicably concludes that except for two locations (RM 4E and 7E) “the concentration declines were not statistically distinguishable from zero.”¹⁶ The EPA’s dismissal of reductions in concentrations is arbitrary and capricious because it is not supported by a credible analysis of the data. An objective review of the data shows contaminant concentrations are in fact declining in most areas of the Site. An agency’s decision may be found arbitrary and capricious if it “offered an explanation for its decision that runs counter to the evidence before the agency, or is so implausible that it could not be ascribed to a difference in view of the product of agency expertise.” *National Association of Home Builders v. Defenders of Wildlife*, 551 US 664, 658 (2007) (quoting *Motor Vehicle Manufacturers Association v. State Farm Mutual Insurance Company*, 463 US 29, 43 (1983)).

EPA’s apparent disregard of the 2012 data as well as LWG’s statistical evaluation of such data is significant because EPA’s use of the higher current SWAC impacts EPA’s detailed

¹² Feasibility Study, page ES-8.

¹³ See FS Appendix J, Table J2.3-1a and FS Table 3.9-1. On Table J2.3-1a, EPA uses 208 ppb PCB as the initial SWAC value. On FS Figure 3.4-1, EPA uses a current SWAC value of 92 ppb PCB. This is a significant and unexplained discrepancy which undermines the value and credibility of EPA’s risk reduction evaluation comparing initial SWACs to post-construction SWACs.

¹⁴ See footnote 4 above.

¹⁵ See reports cited in footnotes 4 and 5 of LWG’s comment letter.

¹⁶ FS, page 3-35.

analysis of alternatives. Using a higher initial SWAC creates the appearance that the more aggressive alternatives achieve greater risk reduction. If an initial SWAC based on actual current data is used, alternatives B and D are more effective in comparison to EPA's preferred Alternative I because they achieve comparable risk reduction at a substantially lower cost and, therefore, are more cost-effective than Alternative I.¹⁷

2. EPA's Metric for Risk Reduction is Arbitrary and Inconsistent with the Current Health Advisory

As explained in EPA's Proposed Plan, there are many contaminants of concern in sediments at the Site. We are focusing on PCBs for purposes of this section because PCBs represent well over 90 percent of the risk to human health. Union Pacific is concerned that EPA is not being responsible in how it describes this risk at the Site and how effective the cleanup will be in reducing this risk.

PCBs are persistent contaminants that travel from sediments to fish to people through the food chain. The primary risk to people from PCBs is through eating resident fish such as carp and smallmouth bass. To express it in simple terms, EPA proposes risk reduction at this Site through dredging or capping sediments to reduce the concentrations of PCBs in fish so that a person can eat a certain amount of resident fish over time and not be exposed to unacceptable risk.

EPA's assessment of the risk of eating resident fish deviates significantly from that of the Oregon Health Authority ("OHA"), without any explanation or viable alternative. For more than 12 years, OHA has advised healthy adults to eat no more than one 8-ounce resident fish meal per month due to PCBs in the Portland Harbor Site and four meals per month due to mercury in the Willamette River mainstem, which includes the Portland Harbor Site. This fish advisory was expressly endorsed by the Agency for Toxic Substances and Disease Registry ("ATSDR") in its 2006 Public Health Assessment for the Site.¹⁸ We are not aware that EPA has ever publicly stated the OHA fish advisory is not protective (or that ATSDR's assessment was erroneous), even after EPA approved the Baseline Human Health Risk Assessment in 2013.

In the 2016 Feasibility Study, EPA stated for the first time that:

OHA would continue the fish consumption advisories already in place under State legal authorities. However, the existing advisories might not be sufficiently effective in protecting human health since the current recommended rate of one meal per month for the general population may not be sufficiently protective of consumers.¹⁹

¹⁷ Specific evaluations of risk reduction achieved by the range of alternatives are included in the LWG's comment letter.

¹⁸ ATSDR Public Health Assessment for Portland Harbor (March 22, 2006), pages 1, 26-27.

¹⁹ FS, page 4-15. On page 37 of the Proposed Plan, EPA states with respect to the No Action Alternative, "OHA may continue to implement the fish consumption advisories already in place under State legal authorities...."

EPA appears to be hedging its bets on what is protective and engages in speculation. But it does not propose an alternative fish advisory that should apply between now and the start of construction of the cleanup, which may be many years from now. EPA's attempt to undermine OHA's and ATSDR's definition of protectiveness is problematic for many reasons.

Even though the risk assessment was completed in 2013, EPA has waited until 2016 to suggest that OHA's fish advisory may not be protective. In the absence of any credible data or explanation by EPA to the contrary, OHA's current advisory is protective, and Union Pacific assumes that OHA and ATSDR stand behind their work.

EPA states that *during construction of the cleanup*, EPA will advise healthy populations to eat no more than six fish meals every 10 years.²⁰ This amount is substantially more conservative than the current OHA advisory of one fish meal per month. Fish meals per 10 years is a brand new concept introduced by EPA for the first time in 2016 in the Feasibility Study and Proposed Plan. EPA does not explain how fish meals per 10 years relates to the BHHRA or how it is linked to construction of the cleanup.

In the absence of an explanation in the FS or Proposed Plan on how six fish meals every 10 years was derived, we assume EPA is concerned that dredging and capping of sediments will release contaminants into the water and increase concentrations in fish. At the end of construction of the preferred alternative, EPA states that the fish advisory can be "relaxed" and a person could eat approximately 50 fish meals every 10 years.²¹ Once the cleanup goals for all contaminants are achieved, EPA would remove its fish advisory. There is no explanation in the FS or the Proposed Plan, or the BHHRA, how EPA derived either 6 or 50 fish meals every 10 years.

EPA's proposed fish advisory would not be effective until the cleanup starts. Footnote 8 on page 38 of the Proposed Plan states that baseline sampling prior to construction of the cleanup will take 3 to 5 years. EPA fails also to reveal that remedial design after baseline sampling could take an additional 5 to 7 years to complete before construction starts. It is reasonable to assume construction may not commence until at least 10 years after the ROD is issued. EPA's failure to provide clear, credible information in the record on why the current fish advisory may not be protective reinforces the arbitrary and capricious nature of the Proposed Plan.

EPA's projected fish advisory that would allow a person to eat 50 fish meals per 10 years after construction of the cleanup means that, after many years and likely over a billion dollars spent, people will be advised to eat less resident fish than they are advised to eat now under the current OHA standard. EPA offers no explanation for this other than the current standard "may not be sufficiently protective of consumers." It is not reasonable and not sound public policy for parties to try to achieve an outcome that lags behind the status quo. It would make no sense for the parties to spend an exorbitant amount of money so perhaps 20 years from now people can eat fewer fish than they can now.

²⁰ Proposed Plan, page 32.

²¹ Proposed Plan, page 58.

Further, as explained in more detail in the section below on cleanup goals, EPA does not have a sound technical basis for representing that cleanup goals, particularly for PCBs, are achievable at the Site. The extremely low concentrations of PCBs in sediments and fish tissue used for remediation goals are not attainable. EPA's claim that CERCLA fish advisories will be removed when cleanup goals are met and protectiveness is achieved is disingenuous and misleading to the public.

In a recent case, a court reviewing a Superfund remedy selection process described the arbitrary and capricious standard: "Arbitrary means the Government simply threw darts or flipped a coin, selecting the remedy without a basis in reason or science. Capricious means it rushed through the process or made a sudden, knee-jerk decision without hearing enough evidence." *United States v. NCR Corp.*, 2012 WL 3778950, at *4 (E.D. Wisc. Aug. 30, 2012).

At this Site, EPA is relying on unsupported assumptions, making important determinations on the effectiveness of alternatives based on metrics that have no basis in reason or science, and is misleading the public about what can be achieved. "Fish meals every 10 years" is EPA throwing darts at an illusory target.

In evaluating risk reduction at the Site it is important to emphasize that the fish advisory based on mercury will not be removed because the source of mercury is primarily agricultural runoff that is beyond the scope of the Superfund cleanup to address. EPA acknowledges this fact but asserts that it is critically important to remove the Superfund-related persistent pollutants (e.g., PCBs) from the environment.

Union Pacific agrees that removing persistent pollutants is important. However, mercury, like PCBs, is also a persistent pollutant that will remain in the river after the cleanup is completed. Accordingly, we assume OHA's fish advisory of no more than four fish meals per month with respect to mercury will remain in place. To a person eating fish from the Site, the issue of critical importance is guidance from a credible health agency on how much fish is safe to eat, regardless of whether the PCB concentration is less than it was before the cleanup began.

Finally, other public health agencies balance the potential health effects from contaminants against the benefits from eating fish.²² In its Feasibility Study and Proposed Plan, EPA has given no indication that it has similarly considered the benefits from eating fish in establishing its very conservative "fish meals per 10 years" amounts.

EPA's assessment of ecological risk is likewise flawed. EPA abandoned the Comprehensive Benthic Risk Area analysis previously developed collaboratively between EPA and the LWG. The agreed-upon analysis was based upon multiple lines of evidence derived from the approved Baseline Ecological Risk Assessment. Instead, rather than relying on

²² See Seafood Choices, Balancing Benefits and Risks, National Academy of Sciences (2007) and Joint Food and Agriculture Organization of the United Nations/World Health Organization Expert Consultation on the Risks and Benefits of Fish Consumption (2010). It should be noted the U.S. Food and Drug Administration's threshold for PCBs in fish is 2 parts per *million*, which is more than 1,000 times higher than EPA's cleanup goal of 0.3 parts per *billion* in resident fish tissue. 21 CFR § 109.30.

empirical data from toxicity testing to delineate benthic risk areas, EPA simplistically mapped benthic PRG exceedances and used a 10 times exceedance factor to identify benthic risk areas. EPA then arbitrarily determined that if active remediation addressed 50 percent of this benthic-risk area of concern, protectiveness ultimately would be achieved.

EPA's assessment of benthic risk is arbitrary and capricious because it is not based on available toxicity testing data in sediments, and no credible scientific basis supports EPA's delineation of benthic risk areas and the extent of remediation necessary to reduce risks in these areas. If there is no risk to benthic organisms based on actual toxicity data, there is no need for remediation in those areas.

It is important to achieve risk reduction at the Site. But the basis for the desired outcome should be explained, the outcome should be achievable, and the means to achieve that outcome should be reasonable and cost-effective. EPA's failure to show how its concept of risk reduction meets these basic requirements is one indication, among many, that its remedy selection process at this Site is arbitrary and capricious.

3. EPA Fails to Evaluate Cost-Effectiveness in Accordance with the NCP

Cost is a critical element for any major project, including Superfund cleanups. CERCLA specifically requires that cleanups be cost-effective.²³ The NCP Preamble states that "risk reduction and cost-effectiveness are major considerations in selecting remedial actions."²⁴ Under the NCP, cost is evaluated together with effectiveness as part of balancing the trade-offs between cleanup alternatives during the detailed analysis of alternatives.

EPA's evaluation of cost-effectiveness is seriously deficient in several respects. At least two viable, less expensive alternatives are not included in the cost-effectiveness evaluation, which leads to the unwarranted conclusion that a more expensive alternative is the only cost-effective solution. EPA's estimated costs for implementation of its preferred alternative are grossly understated. EPA's consideration of long-term and short-term effectiveness, both required elements of the cost-effectiveness evaluation, are not reasonable based on the magnitude and impact of a cleanup at a sediment mega-site such as Portland Harbor.

a. EPA Arbitrarily Excludes Viable Alternatives from the Cost-Effectiveness Evaluation

Cost-effectiveness determinations require a comparison of all viable alternatives. In the Proposed Plan, EPA's cost-effectiveness assessment compares only Alternatives E (\$688 million) and I (\$746 million), which are similar in scope and cost. EPA's determination of cost-effectiveness is unreasonably biased towards an alternative that is more expensive than warranted by actual Site conditions. By excluding Alternatives B (\$451 million) and D (\$654 million) based on reasons not supported by the record, EPA has acted in a manner that is arbitrary and capricious.

²³ 42 U.S.C. § 9621(b).

²⁴ NCP Preamble, 55 FR 8725.

Alternative B, which EPA characterizes as "protective," is not carried through the detailed analysis of alternatives because EPA asserts it will not achieve chemical-specific ARARs in a reasonable time frame.²⁵ EPA does not identify which chemical-specific ARARs would not be achieved. Alternative D is not included apparently because it "may not meet the threshold criteria," but again, EPA provides no meaningful explanation.²⁶

However, these so-called findings are facially inconsistent with EPA's description of Alternatives B and D in the 2015 draft FS. In the 2015 draft FS, EPA stated, "Alternative B, in conjunction with MNR [monitored natural recovery] and institutional controls, is expected to be protective of human health" and "Alternative B would comply with ARARs. Chemical specific ARARs would be met over time through implementation of a combination of in-river remedial technologies."²⁷

Similarly, EPA states in the 2015 draft FS, "Alternative D, in conjunction with MNR and institutional controls, is expected to be protective of human health" and "Alternative D would comply with ARARs. Chemical specific ARARs would be met over time through implementation of a combination of remedial technologies."²⁸

While Alternatives B and D appeared to be acceptable to EPA in 2015, EPA deemed them unacceptable in 2016, without the benefit of additional data or a basis for justifying EPA's change in position. In the absence of a rational, clear explanation or new information, EPA's changed findings regarding Alternatives B and D, and their exclusion of these alternatives from the cost-effectiveness evaluation, is arbitrary and capricious.

b. EPA's Cost-Effectiveness Evaluation is Limited and Superficial

On page 67 of the Proposed Plan, EPA states that cost-effectiveness is based on three criteria: long-term effectiveness and permanence, reduction of toxicity, mobility or volume through treatment, and short-term effectiveness. This statement is consistent with the description of cost-effectiveness in 40 C.F.R 300.430(f)(1)(i)(D). Yet it does not include the next critical sentence in the regulation which reads: "Overall effectiveness is then compared to cost to ensure that the remedy is cost-effective." Consistent with this omission, EPA discussion of costs on page 67 is perfunctory at best.

EPA's cost-effectiveness evaluation is limited to comparing the net present value estimates of Alternative I (\$746 million) to Alternative E (\$804 million) and concluding that Alternative I is more cost effective because it requires approximately 40 fewer acres of dredging while achieving the same risk reduction at construction completion.²⁹ Subsequent paragraphs

²⁵ Proposed Plan, pages 50 and 52.

²⁶ Proposed Plan, page 58.

²⁷ 2015 Draft FS, pages 4-15 and 4-17.

²⁸ 2015 Draft FS, pages 4-37 and 4-39.

²⁹ We note these estimated amounts in the Proposed Plan, which assume use of a confined disposal facility ("CDF"), are significantly different than the present value estimates for Alternative E (\$869 million) and Alternative I (\$811 million) shown on the summary Table CS-Alt in FS Appendix G

on page 67 do nothing more than explain that Alternatives E and I are similar with respect to area capped, short-term effectiveness (both estimated to take 7 years to perform), and volumes for ex-situ treatment and acreage of in-situ treatment, implying that these factors do not differentiate the cost-effectiveness of the alternatives. For a cleanup that EPA estimates will cost \$746 million, this analysis is obviously (and unreasonably) superficial.

c. EPA's Estimated Costs are Significantly Understated

The City of Portland and the Port of Portland have publicly stated that EPA's cost estimates for its preferred remedy are far too low. Analyses by AECOM, ExxonMobil's consultant, and AnchorQEA, the LWG's experienced sediment remediation consultant, show that EPA's non-discounted estimate of the cost to perform its preferred alternative is underestimated by about \$470 million to over \$953 million, respectively.³⁰ The substantial differences between cost estimates prepared by EPA and by experienced sediment remediation consultants undermine the integrity and reliability of EPA's cost-effectiveness determination.

d. EPA's Evaluation of Long-Term effectiveness is Unreasonable

Long-term effectiveness is one of the NCP's nine criteria for evaluation and selection of cleanup alternatives. As defined by the NCP: "Alternatives shall be assessed for the long-term effectiveness and permanence they afford, along with the degree of certainty that the alternative will prove successful."³¹ This requires an evaluation of how well alternatives will achieve cleanup goals at the end of the project. Long-term effectiveness is also part of the cost-effectiveness evaluation.

At this Site, the record provides no basis for EPA to assume that one alternative will perform better than another with respect to meeting cleanup goals, ARARs, or interim targets within a "reasonable time frame."

Rather than focusing on attainment of cleanup goals, EPA uses "risk reduction at construction completion" as the metric for evaluating long-term effectiveness. EPA's Proposed Plan, Table 17, purports to show what risk numbers will be achieved at the end of construction.³² As explained above, the risk numbers are based on SWAC reductions that are suspect at best because EPA is starting out with an initial SWAC that is far too high based on current data at the Site. Moreover, "risk reduction at construction completion" is a made-up factor.

(Detailed Analysis Cost Estimates Feasibility Study), which assume no CDF. EPA does not explain why different assumptions are used in presenting costs.

³⁰ EPA's non-discounted estimated cost for Alternative I is \$1,173,299,000. AECOM's non-discounted estimated cost for Alternative I is \$1,644,000,000. AECOM 2016. *Portland Harbor Sustainability Project, Environmental Sustainability Analysis Report, Appendix E Cost and Time Analysis Report of EPA Feasibility Study Remedial Alternatives*. Prepared for the Portland Harbor Superfund Site Sustainability Project. September 2016. The LWG's non-discounted estimated cost for Alternative I is \$2,126,530,000. LWG's Cost Evaluation (August 29, 2016).

³¹ 40 CFR § 300.430(e)(9)(iii)(C).

³² Proposed Plan, page 66.

EPA explains it is using "interim risk targets" for purposes of comparing the alternatives and what level of risk reduction they provide at the end of construction.³³ With respect to the remedial action objective for fish consumption (RAO 2), EPA states:

Carcinogenic risks on a Site-wide scale do not achieve the interim target of 1×10^{-4} with Alternatives B, D, E and I; the interim target is achieved with Alternatives F and G. On a river mile scale, none of the alternatives achieve[s] the carcinogenic risk interim target of 1×10^{-4} . On an SDU scale, Alternatives B, D, E, F, and I do not achieve the carcinogenic risk interim target of 1×10^{-4} ; Alternative G achieves the interim target.³⁴

If risk reduction at construction completion is the key standard, it is not apparent why Alternatives E and I are part of the cost-effectiveness evaluation because neither, according to EPA's statement above, will achieve the key interim target for the Site.

EPA attempts to rationalize using "interim targets" or "risk reduction at construction completion" by stating that post-construction, PRGs will be achieved in a "reasonable time frame" through natural recovery. But EPA's determination of "reasonable time frame" is suspect. "Reasonable time frame" is never defined in the Proposed Plan. In one sentence on page 4-6 of the Feasibility Study, EPA defines reasonable time frame as 30 years. EPA *assumes* Alternatives E and I will achieve cleanup goals and ARARs in 30 years (and *assumes* Alternatives B and D will not). However, there is no information in the record to support these assumptions. In the Feasibility Study, EPA refers to Appendix D. However, Appendix D only confirms that natural recovery is ongoing in certain areas of the Site and does not provide any estimates or projections on when cleanup levels, including those based on chemical-specific ARARs, will be achieved.

EPA explains in FS section 4.1.2 that there is too much uncertainty to use a hydrodynamic and sediment transport model ("HST") to predict quantitative reductions in contaminant concentrations following implementation of cleanup alternatives at the Site. Yet it states with assurance in the Proposed Plan that certain alternatives (but not Alternatives B and D) will achieve cleanup goals, including those based on chemical-specific ARARs. In the absence of credible information to support its assumptions, EPA has no basis for representing whether alternatives will or will not achieve cleanup goals within a certain time. This is a critical omission in the cost-effectiveness determination. A much less expensive alternative may achieve cleanup goals in a comparable time frame as a much more expensive alternative. As noted in the *NCR* case above, selecting a cleanup action that is not based on reason or science is one of the key hallmarks of a decision that is arbitrary and capricious.

e. EPA's Evaluation of Short-Term Effectiveness is Also Unreasonable

EPA's evaluation of short-term effectiveness, which is another required element of the cost-effectiveness determination, requires consideration of the effects of the alternative during the construction and implementation phase until remedial response objectives are met. Similar

³³ Proposed Plan, page 51.

³⁴ *Id.*

to its consideration of cost and long-term effectiveness, EPA's evaluation of this factor is also far less than necessary for a project of this magnitude.³⁵ At sediment sites, short-term risks associated with capping and dredging may include potential contaminant releases during such operations (which may increase contaminant concentrations in fish tissue) as well as accidents to workers, disruptions to business and recreational uses, and other impacts to the community (e.g., from light, noise, and air emissions).³⁶

The FS does not include a reasonable quantification of the above-described short-term impacts, such as realistic estimates of the extent of dredge releases (e.g., water quality impacts). For each more aggressive alternative, the FS simply says the short-term impacts will be "greater." At a site where the cleanup will take many years to perform, a realistic evaluation of the time to perform the cleanup also needs to be incorporated into the evaluation of short-term impacts.

Further, the FS is overly optimistic about the estimated time to perform each of the alternatives. In October 2016, the Port of Portland ("Port"), which has extensive experience with dredging projects, participated in a meeting with Jim Woolford, the head of EPA's national Superfund program, and explained that EPA's estimates of construction duration and cost were not reasonable and needed to be revised. On October 13, 2015, the LWG provided Mr. Woolford a memo which incorporated the Port's and AnchorQEA's analysis.³⁷ The FS fails to incorporate the Port/LWG's estimates and does not explain why it disagreed with them. Based on the memo, which incorporated the Port's real-life experience with dredging projects, the magnitude and duration of short-term impacts associated with the cleanup are substantially underestimated in the FS.

Moreover, the NCP requires not only an assessment of individual alternatives against each of the nine criteria but also "a comparative analysis that focuses upon the relative performance of each alternative against those criteria."³⁸ The so-called comparative analysis in the FS is oversimplified and does not attempt meaningfully to consider the trade-offs between increasing short-term impacts and the alleged benefits of more expansive dredging and capping requirements.

If, for example, the water quality impacts (and associated impacts to fish tissue concentrations) from dredging are increasingly significant as the extent of dredging and capping increases, then there should be corresponding increases in the benefits from performing such increasingly more aggressive approaches. However, the FS does not include a credible explanation of how the preferred alternative's combination of active remediation and monitored natural recovery achieves cleanup goals in a substantially shorter time than less aggressive

³⁵ 40 C.F.R. § 300.430(e)(9)(iii)(E).

³⁶ EPA Sediment Guidance, at page 7-9.

³⁷ Assessment of Dredging Production Rates and Construction Duration Assumptions on EPA's FS Cost Estimates (October 8, 2015).

³⁸ 40 C.F.R. § 300.430(e)(9)(ii).

alternatives using a different combination (*i.e.*, more monitored natural recovery). The required balancing of trade-offs under the NCP is conspicuously absent from the FS.

f. EPA's Cost-Effectiveness Determination Undermines the Evaluation Process

EPA's failure to conduct the required comparison of the relative magnitude of cost to effectiveness and whether the benefits in risk reduction to be achieved under more expensive alternatives are proportional to the costs is clearly contrary to the requirements of the NCP.³⁹ When the estimated costs of alternatives differs by hundreds of millions of dollars, and the estimated cost of EPA's preferred alternative may be understated by at least \$470 million and more likely over \$950 million, EPA's failure to conduct a legitimate evaluation of cost compared to effectiveness among the alternatives is reason alone for a court to find that EPA's remedy selection process is arbitrary and capricious and contrary to law.

4. EPA's PCB Cleanup Goal is Not Achievable

The preliminary remediation goal ("PRG") for total PCBs in the FS is 9 parts per billion ("ppb"). The basis for this value is that it is the "background" value determined by EPA in the RI. The cleanup goal for PCBs is highly significant because PCBs are driving over 90 percent of the risk at the Site.

The record does not contain information that demonstrates that a cleanup to the background number is achievable at the Site and that background should be used as a cleanup goal. Neither CERCLA nor the NCP authorizes EPA to select cleanup goals that are not achievable. EPA's guidance states the FS should confirm that cleanup goals are achievable by the sediment cleanup itself.⁴⁰

In section 7.2.2 of the RI, the upriver reach of the Lower Willamette River extending from RM 15.3 to 28.4 was selected as the reference area for determining PCB background sediment concentrations. Although separated from the Site by anywhere from four to 17 miles, EPA chose this area because it is considered broadly representative of the upstream sediment loading to Portland Harbor. Based on its evaluation of data from this reference area, EPA determined the background concentration for PCBs for the Site is 9 ppb.

The LWG disputed how EPA evaluated the data in determining background. In his letter denying the dispute, Richard Albright, the then-current Director of the Superfund program in Region 10, wrote:

I would like to emphasize that as noted by EPA's Response at p. 24, there are sources of contamination outside of the Site – both upriver of the Site and within the downtown reach – that may affect the ability of the cleanup efforts within the Site to equilibrate to the selected cleanup level regardless of whether the cleanup level is based on risk, regulatory standard or background. In this

³⁹ NCP Preamble, "Role of cost in the cost-effectiveness determination," 55 FR 8726-8730.

⁴⁰ 2005 Sediment Guidance, page 2-15.

regard, the Site is similar to other urban sediment sites which CERCLA addresses like the Lower Duwamish Site in Seattle.⁴¹

If the Site cannot “equilibrate” to 9 ppb, the cleanup level will not be achieved by the sediment cleanup action. The LWG submitted comments to EPA explaining how equilibrium, not background, should be used to establish PRGs and evaluate FS alternatives. The final FS appears to disregard all of this information.

Perhaps the most reliable certainty at the Site is that the Lower Willamette River continuously flows in one direction, from south to north, without pause or deviation. As part of the flow, the river carries sediments, much of which are deposited within the Site. Equilibrium is the result, in part, of concentrations of contaminants in the incoming sediments from upstream. As strongly suggested by Richard Albright, active remediation within the Site cannot achieve concentrations lower than that of the equilibrium level.

The LWG calculated equilibrium concentrations based on existing RI empirical data, including deposited surface sediment data (from depositional areas upstream of the Site and from depositional areas within the upper reaches of the Site but apart from known source areas), sediment trap data, upstream suspended sediment data, and smallmouth bass fish tissue data from 2002, 2007, and 2012. The result of the LWG’s evaluation of empirical data, which was presented to EPA in August 2014, is that the equilibrium value for total PCBs should be 20 ppb.⁴² The LWG advised that EPA should not select risk-based PRGs below equilibrium values, including those for PCBs. EPA’s failure to base its cleanup number on equilibrium values, and its failure to explain why the FS does not incorporate any evaluation of equilibrium, are inconsistent with the reasoning of its own former Director and an array of real-world data, and undermine the presumption that EPA’s proposed cleanup goal for total PCBs is realistically achievable.

Further, as explained above, EPA’s failure to use reliable models to predict when cleanup goals will be attained is another significant omission in the FS. In effect, EPA has not included any credible information in the FS indicating that its cleanup goals, particularly for PCBs, are actually achievable and sustainable over the long-term at the Site. The importance of models (e.g., hydrodynamic and sediment transport models) in making cleanup decisions at sediment sites is explained in detail in the EPA’s 2005 Sediment Guidance.⁴³ Such models are generally used at large sediment sites (e.g., Lower Duwamish and Lower Passaic sites), but were not used here. Modeling is considered by experts to be an essential element in remedial selection and planning at sediment mega-sites. Ignoring the LWG’s equilibrium calculations, failing to perform predictive modeling, and setting an unachievable PCB cleanup goal equal to

⁴¹ Richard Albright letter to LWG dated March 24, 2015, page 16.

⁴² “Sediment Equilibrium Estimates for the Revised Feasibility Study,” LWG Technical Memorandum (August 7, 2014).

⁴³ 2005 Sediment Guidance, section 2.9.

background are arbitrary and capricious decisions stripping the remedy selection process of credibility.

5. The Proposed Plan Requires More Sediment Removal Than Necessary

The NCP Preamble states: "Principal threats are characterized as waste that cannot be reliably controlled in place, such as liquids, highly mobile materials (e.g., solvents), and high concentrations of toxic compounds (e.g., several orders of magnitude above levels that allow for unrestricted use and unlimited exposure)."⁴⁴

In the FS and Proposed Plan, EPA has designated large areas of sediments with relatively low concentrations as principal threat waste ("PTW") (e.g., above 200 ppb total PCBs) that must be dredged from the Site, including sediments between RM 10 and 11 near Union Pacific's Albina Yard. However, the FS fails satisfactorily to explain how sediments in these large areas are highly mobile or highly toxic *and* must be removed and/or treated. As stated in the FS, PCBs can be reliably contained "[a]t all concentrations measured at the Site."⁴⁵

The FS does not contain a credible conceptual site model that identifies the extent to which certain areas of sediments are "highly mobile" and need to be removed. Most areas of the Site are depositional, meaning that sediments in these areas are stable and likely to remain in place in the future. In many cases, where contaminant concentrations in surface sediments in these areas represent an unacceptable risk, consistent with FS Table 3.2-2, such sediments can be reliably contained in place.⁴⁶ The Proposed Plan is unclear in explaining why sediments that EPA designates as "reliably contained" are defined as PTW. Even if EPA used an acceptable definition of "highly toxic," the fact that PCBs in sediments in most areas of the Site can be "reliably contained" means they should not be designated as PTW.

Moreover, the PCB levels in the river are not "highly toxic." In the risk assessment, EPA identifies unacceptable risks based on fish consumption, which is an *indirect* exposure pathway (i.e., people are not eating contaminated sediments). Consistent with acceptable risk assessment methodology, exposure assumptions are averaged over time and space to best represent potential *indirect* exposure to people eating fish. The exposure units for the fish consumption pathway range from site-wide to individual EPA river miles, depending on the home range of the fish species.

In its designation of PTW, however, EPA disregards acceptable methods for assessing indirect risk and identification of PTW thresholds. In the Proposed Plan, any sediment that exceeds 200 ppb PCBs is deemed PTW. Neither the FS nor Proposed Plan explains or justifies why sediment at such a relatively low concentration is "highly toxic" (i.e., several orders of magnitude above levels that allow for unrestricted use and unlimited exposure). At many other sediment mega-sites around the country, EPA's *cleanup level* for total PCBs is 1 part per

⁴⁴ 55 FR 8703.

⁴⁵ FS Table 3.2-2.

⁴⁶ It is impossible to reconcile Table 3.2-2 with Proposed Plan Figure 7 which shows large areas of the Site as PTW.

million. Sediment containing PCBs at 200 ppb is one-fifth of what is considered an acceptable cleanup level at these other sites. EPA's designation of "highly toxic" material at Portland Harbor is without basis, contrary to policy and practice elsewhere, and not reasonable.

Further, as the LWG has explained to EPA, EPA's decision to cap, rather than remove, more highly contaminated sediments associated with the McCormick-Baxter site is inconsistent with its current position on treating principal threat waste elsewhere at the Site

6. Sediments Near Albina Yard Do Not Require Cleanup

The FS preferred alternative identifies two areas of sediments on the east side of the river between RM 10 and 11 that EPA has identified for cleanup, purportedly due to exceedances of the PCB remedial action level ("RAL"). EPA also identified these areas as containing principal threat waste.⁴⁷ This area of the Site is near Union Pacific's railyard at Albina Yard. Union Pacific disagrees with this determination in the area from approximately RM 10.7 to RM 11 where there are no exceedances of the applicable RAL of 200 ppb PCBs in surface or subsurface samples of sediments.⁴⁸

EPA's potential cleanup area near RM 10.7 appears to be based on a PCB exceedance in soil at one location on a 900-foot stretch of the riverbank. EPA included riverbanks as part of its draft FS evaluation of alternatives, but did not identify Albina Yard as a site with "known contaminated riverbank."⁴⁹

Moreover, Union Pacific determined that the riverbank near Albina Yard had a low potential for erosion because it was highly vegetated and stabilized with rock/rip rap.⁵⁰ Because PCB concentrations in the sediments are below the applicable RAL, and the riverbank is stable, this area of sediments near RM 10.7 should not be included as a potential cleanup area. Neither the FS nor the Proposed Plan contains an explanation for this area's inclusion as a potential cleanup area, much less as an area containing principal threat waste.

EPA's determination that sediments near RM 10.7 exceed RALs and must be remediated as PTW is not based on available data and is therefore arbitrary and capricious. Further, if a more reasonable RAL for PCBs is used at the Site (e.g., 750 ppb), no cleanup of sediments on the east side of the river between RM 10 and 11 would be warranted. Nonetheless, EPA's proposed capping near RM 10.1 is modest and should be managed separately from the rest of the Site.

⁴⁷ See FS Figure 3.2-3.

⁴⁸ See RI Maps 5.2-2 and 5.2-3dd and FS Figures 1.2-6a and 1.2-6b.

⁴⁹ See FS section 1.2.3.5 and Proposed Plan Figure 6.

⁵⁰ Final Remedial Investigation/Source Control Measures Evaluation Report for Albina Yard (November 2010). Oregon DEQ did not require remediation of the river bank in its Record of Decision for Albina Yard dated June 2012, or as a condition for issuing a No Further Action determination dated June 23, 2014, for Albina Yard.

7. The Port's Previous Remediation of Sediments in Terminal 4, Slip 3 Should Be Incorporated in the Final Cleanup

Terminal 4, Slip 3 has been used as a major marine terminal for the last hundred years.⁵¹ EPA's FS shows exceedances of the RALs for PCBs and total PAHs in Terminal 4, Slip 3.⁵² Spills of pencil pitch loaded and unloaded by several parties in Slip 3 is the predominant source of PAHs in Slip 3.⁵³

EPA and the Port entered into an Administrative Order on Consent in 2003 in which the Port agreed to perform a removal action to address contaminants in Terminal 4, including Slip 3. The Port conducted a removal action in 2008 that included dredging approximately 13,000 cubic yards of contaminated sediment and disposal in an offsite disposal facility, isolating contaminated sediment at the head of Slip 3 with a cap made of an organoclay-sand mix, and re-contouring the slope of the bank along Wheeler Bay and planting native vegetation to minimize erosion and improve stability.⁵⁴

In addition, in accordance with a settlement agreement with the Port, Union Pacific conducted Site investigation and remediation activities between 2001 and 2003 at its tank farm area. In 2004, Oregon DEQ determined that no further action was required at the tank farm. Oregon DEQ further stated that groundwater investigations had shown only minor impacts to groundwater.⁵⁵

EPA's FS makes passing reference to the Port's 2008 removal action but shows extensive areas to be dredged and capped in Slip 3. As a result, it is not clear to what extent EPA is proposing that elements of the Port's removal action, including the organoclay-sand mix cap at the head of Slip 3, be removed through new dredging or otherwise re-done as part of the final cleanup action.⁵⁶ Union Pacific believes the cap installed by the Port is protective and should be left intact in Slip 3. Further, the FS is not clear whether areas of sediments dredged in 2008 by the Port need to be re-dredged as part of the final cleanup and, if so, why this would be necessary. EPA's selected cleanup should acknowledge the Port's prior removal action, including the cap at the head of Slip 3.

In addition, Union Pacific generally supports the Port's comments on Slip 3 with respect to an optimized alternative remedy for Terminal 4 that recognizes that the risk from direct contact exposure to sediments is inapplicable due to public access restrictions, allows for the refinement of benthic risk areas based on up-to-date data, includes flexibility to adjust the cleanup based on site conditions and operational requirements, and does not undermine existing slopes, structures, and previously placed caps.

⁵¹ *The Port of Portland v. Union Pacific Railroad Company*, U.S. District Court for the District of Oregon, CV 98-866-PA (March 26, 2001), page 3.

⁵² See FS Figures 1.2-6a, 1.2-6b, 1.2-9a, and 1.2-9b.

⁵³ *Port of Portland v. Union Pacific*, page 15.

⁵⁴ Final Remedial Investigation Report, page 3-91 (February 8, 2016).

⁵⁵ Oregon DEQ letter to Union Pacific (September 23, 2004).

⁵⁶ See FS, page 1-8 and FS Figure 3.8-9c.

Union Pacific does not agree with the Port's assertion that seepage from a former Union Pacific fuel pipeline is a "primary source" of PAHs in Slip 3. In 2001, a U.S. District Court judge adjudicated the relative contributions of pencil pitch (a product unrelated to the fuel pipeline) and fuel in Slip 3 and ruled: "I find that the primary hazardous substances in the Slip are from pencil pitch."⁵⁷

8. Conclusion

EPA's FS and Proposed Plan do not comply in numerous, significant ways with regulatory requirements and guidance recommendations for evaluating and selecting remedial approaches at sediment mega-sites. EPA's description of a preferred alternative is not realistic and will not achieve protection of human health and the environment for a reasonable cost and within a reasonable time frame.

As a member of the LWG, Union Pacific has contributed to the investigation and evaluation of cleanup alternatives for Portland Harbor, and requests that EPA select and implement a remedy that will achieve meaningful risk reduction in a timely and cost-effective fashion. Union Pacific requests that EPA carefully consider these comments and the comments from the LWG and other PRPs and make the necessary adjustments before finalizing a Record of Decision for the Site.

Union Pacific requests that these comments and all attached and cited documents and sources be included in the Administrative Record. We have enclosed a disk with copies of the documents.

Very truly yours,



Robert C. Bylsma

cc: Lori Cora

⁵⁷ *Port of Portland v. Union Pacific*, page 15.